



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,218	09/19/2005	Ilias Manettas	2003P00534WOUS	1364

46726 7590 01/30/2007  
BSH HOME APPLIANCES CORPORATION  
INTELLECTUAL PROPERTY DEPARTMENT  
100 BOSCH BOULEVARD  
NEW BERN, NC 28562

EXAMINER

RALIS, STEPHEN J

ART UNIT PAPER NUMBER

3742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/550,218	<b>Applicant(s)</b> MANETTAS ET AL.	
	<b>Examiner</b> Stephen J. Ralis	<b>Art Unit</b> 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 12-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/19/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Priority*

1. Applicant's claim for foreign priority benefit of German Application No. 10315522.8, filed 04 April 2003, is acknowledged and granted.
2. If applicant desires to claim the benefit of a prior-filed application under 35 U.S.C. 119(e) and/or 120, a specific reference to the prior-filed application in compliance with 37 CFR 1.78(a) must be included in the first sentence(s) of the specification following the title or in an application data sheet. For benefit claims under 35 U.S.C. 120, 121 or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of the applications.

If the instant application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or

Art Unit: 3742

120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

If the reference to the prior application was previously submitted within the time period set forth in 37 CFR 1.78(a), but not in the first sentence(s) of the specification or an application data sheet (ADS) as required by 37 CFR 1.78(a) (e.g., if the reference was submitted in an oath or declaration or the application transmittal letter), and the information concerning the benefit claim was recognized by the Office as shown by its inclusion on the first filing receipt, the petition under 37 CFR 1.78(a) and the surcharge under 37 CFR 1.17(t) are not required. Applicant is still required to submit the reference in compliance with 37 CFR 1.78(a) by filing an amendment to the first sentence(s) of the specification or an ADS. See MPEP § 201.11.

***Specification***

3. The disclosure is objected to because of the following informalities: page 1, line 24: "them is necessary" should read –them are necessary–.

Appropriate correction is required.

***Claim Objections***

4. Claims 18 and 26 are objected to because of the following informalities: "an indirect alternating frequency current" should read –an alternating frequency current–, since it is known in the art that an alternating frequency current (AC) is inherently indirect since it is not direct current, DC. Appropriate correction is required.

5. Claims 17 and 25 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In the instant case, the limitation of the parent claims, 16 and 24, recite the limitations of assigning values below 150 VAC. Claims 17 and 25 recite the limitations of assigning values below 165 VAC which is not below 150 VAC, therefore, further limit the subject matter of a previous claim.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 3742

7. Claims 12- 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 12 recites the limitation "the supply voltage" in line 3. There is insufficient antecedent basis for this limitation in the claim. The claim is examined as –a supply voltage–.

9. Claim 12 recites the limitation "the supply current" in line 4. There is insufficient antecedent basis for this limitation in the claim. The claim is examined as –a supply current–.

10. Claims 13-19 are rejected based on their dependency thereof on independent claim 12.

11. Claim 19 recites the limitation " the supply current " in line 8. There is insufficient antecedent basis for this limitation in the claim. The claim is examined as –a supply current–.

12. Claims 20-26 are rejected based on their dependency thereof on independent claim 19.

13. Claims 17 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: assigning voltage values below at least (150/165) VAC and a pulse-duty ratio of 1 *a value*. The claims are respectfully examined as –assigning voltage values below at least 150 VAC a pulse-duty ratio of 1– and –assigning voltage values below at least 165 VAC a pulse-duty ratio of 1–.

Art Unit: 3742

14. Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: assigning voltage values below at least (150/165) VAC and a pulse-duty ratio of 1 a *value*. The claims are respectfully examined as –assigns voltage values below at least 150 VAC a pulse-duty ratio of 1– and –assigns voltage values below at least 165 VAC a pulse-duty ratio of 1–.

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 12 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirsch (European Patent Application Publication No. EP 1180652A1).

Hirsch discloses a refrigeration device (refrigerator 1) and a method of operating a defroster heater of the refrigeration device, comprising: an integrated defroster heater (heater 13); a voltage supply coupled to said defroster heater (mains voltage); a recording circuit (mains voltage detector 19/unit 10/comparator 8a combination) coupled to the voltage supply for recording a voltage value supplied to the defroster heater (column 6-7, paragraph 24); the recording circuit (mains voltage detector 19/unit 10/comparator 8a combination) generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value (unit 10 providing a duration response

Art Unit: 3742

according to detected voltage; column 7, paragraphs 25-27); and a circuit breaker (timer/trigger 6) activated by said control signal for the supply current fed to the defroster heater (column 7, paragraphs 25-27).

With respect to the limitation of claims 12 and 19 and the recording circuit generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value, Hirsch discloses determining a defrost duration with respect to voltage values (column 7, paragraphs 25-27) and the defrost duration with respect to voltage values would inherently be a keyed pulse-width of the power supplied to the defroster/heater (13), since power being applied is a pulse and the duration being the width thereof.

With respect to the limitation of claims 13-14 and 20-22 and the pulse-duty ratio being generated as a decreasing step function of said recorded voltage value; and the step function having three or more discrete values, Hirsch discloses the unit (10) for determining a target defrost duration (inherent pulse-width) receiving the detected mains voltage level and uses the digitally converted value (control signal) as a seed into a look-up table to generate a duration required based the detected voltage (column 7, paragraphs 25-27). A look up table comprises a set of duration values associated with different mains voltages (column 7, paragraph 27). Therefore in order to compensate for fluctuations in the mains voltage, the look-up table would inherently be both step decreasing and step increasing functions depending on where in the look-up table the algorithm is. Furthermore, the step function would inherently have three or more discrete values since the compensation of different mains voltages internationally, since



Art Unit: 3742

as discloses by Hirsch, the invention achieves an optimized adaptive defrost even when operating the refrigerator in countries (i.e. plurality) where the mains power supply suffers from load dependant voltage instabilities (Abstract).

With respect to the limitations of claims 18 and 26 and the supply current being an alternating frequency current and keying the supply current with a keyed frequency, which is a fraction of the supply current alternating frequency, Hirsch discloses unit (10) for determining a target defrost duration (inherent pulse-width) receiving the detected mains voltage level and uses the digitally converted value (control signal) as a seed into a look-up table to generate a duration required based the detected voltage (column 7, paragraphs 25-27). Hirsch further discloses the value, determined in the look-up table of unit (10), being input into comparator (8a) to determine the deviation between the actual duration and required deviation thereof and providing a required duration (pulse-width) of power. Since the current of Hirsch is not being applied to the defroster/heater (13) continuously, the limited duration of an alternating frequency current supply of Hirsch is inherently a fraction of the supplied alternating frequency current,

17. Claims 12, 18, 19 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Oishi et al. (U.S. Patent No. 4,432,211).

Oishi et al. disclose refrigeration device (cooler 1 or refrigerator; Abstract) and a method of operating a defroster heater of the refrigeration device, comprising: an integrated defroster heater (defrosting heater 2, 20); a voltage supply coupled to said defroster heater (power source 18); a recording circuit (current detecting circuit

Art Unit: 3742

22/arithmetic processing circuit 23/control circuit 24 combination) coupled to the voltage supply for recording a voltage value supplied to the defroster heater (column 5, line 62 – column 10, line 30); the recording circuit (current detecting circuit 22/arithmetic processing circuit 23/control circuit 24 combination) generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value (control circuit 24 providing a control signal response according to detected voltage; column 7, lines 62-67; column 9, line 66 – column 10, line 3; column 15, lines, 57-61; column 16, lines 17-22; see Figures 5, 8, 10, 13, 14); and a circuit breaker (current supply switch 21) activated by said control signal for the supply current fed to the defroster heater (column 7, lines 62-67; column 9, line 66 – column 10, line 3; column 15, lines, 57-61; column 16, lines 17-22).

With respect to the limitation of claims 12 and 19 and the recording circuit generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value, Oishi et al. disclose detecting the voltage of the heater (2, 20) from the power supply (18) and determining via the control circuitry, see Figures 5, 8, 10, 13, 14, whether or not open or close current supply switch (21) and control the duration of the current supplied (pulse-width) to the defrosting heater (2, 20). Therefore, the duration with respect to the applied current of Oishi et al. would inherently be a pulse-width of power supplied to the defrosting heater (2, 20), since power being applied is a pulse and the duration being the width thereof.

With respect to the limitations of claims 18 and 26 and the supply current being an alternating frequency current and keying the supply current with a keyed frequency,

Art Unit: 3742

which is a fraction of the supply current alternating frequency, Oishi et al. disclose detecting the voltage of the heater (20) from the power supply (18) and determining via the control circuitry, see Figures 5, 8, 10, 13, 14, whether or not open or close current supply switch (21) to control the duration of the current supplied (pulse-width) to the defrosting heater (2, 20). Similarly as noted above, the duration with respect to the applied current of Oishi et al. would inherently be a pulse-width of power supplied to the defrosting heater (2, 20), since power being applied is a pulse and the duration being the width thereof. Since the current of Oishi et al. is not being applied to the defrosting heater (2, 20) continuously, the limited duration of an alternating frequency current supply of Oishi et al. is inherently a fraction of the supplied alternating frequency current,

18. Claims 12-14, 18-21 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Joseph et al. (U.S. Publication No. 2004/0004803).

Joseph et al. disclose refrigeration device (refrigeration compartment 24; see Figure 1) and a method of operating a defroster heater of the refrigeration device, comprising: an integrated defroster heater (defroster heater 88; page 5, paragraph 54); a voltage supply coupled to said defroster heater (power source 9); a recording circuit (microprocessor 19) coupled to the voltage supply for recording a voltage value supplied to the defroster heater (see Figure 1); the recording circuit (microprocessor 19) generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value (page 2 paragraph 26 – page 3, paragraph 36); and a circuit breaker (triac

Art Unit: 3742

7/switch 47/coil 3 combination) activated by said control signal for the supply current fed to the defroster heater page 2 paragraph 26 – page 3, paragraph 36).

With respect to the limitation of claims 12 and 19 and the recording circuit generating a keyed control signal with a pulse-duty ratio dependent on the recorded voltage value, Joseph et al. disclose a microprocessor (19) that would inherently have memory for reading and storing the detected voltage at input (50). Joseph et al. further disclose the microprocessor (19) controlling the pulse-width depending on the sinusoidal input waveform that generates an associated gate pulse (45) on the line (17) after a selected time delay (D0) that corresponds to the amplitude of the input voltage and it is that time delay that determines the width (W0) of the pulse (page 3, paragraph 32; see Figure 2). In addition, Joseph et al. disclose the width of the pulse (W1) decreasing with respect to the increase in sinusoidal voltage (page 3, paragraph 33; see Figure 2).

With respect to the limitation of claims 13-14 and 20-21 and the pulse-duty ratio is generated as a decreasing step function of said recorded voltage value; and the step function having three or more discrete values, Joseph et al. disclose generating a pulse width (W0) decreasing the pulse width to (W1) as a step function based on the varying of the AC signal from (V0) to (V1) (page 3, paragraphs 32-33; see Figure 2). Joseph et al. further disclose at least two discrete values for the step function (W0, W1) in a predetermined range of fluctuation between (V0) and (V1).

With respect to the limitations of claims 18 and 26 and the supply current being an alternating frequency current and keying the supply current with a keyed frequency,

Art Unit: 3742

which is a fraction of the supply current alternating frequency, Joseph et al. disclose generating a pulse width (W0) decreasing the pulse width to (W1) as a step function based on the varying of the AC signal form (V0) to (V1) (page 3, paragraphs 32-33; see Figure 2) to control the energization of the switch (47). Joseph et al. further disclose at least two discrete values for the step function (W0, W1) in a predetermined range of fluctuation between (V0) and (V1). Therefore since the current of Joseph et al. is not being applied to the defroster heater (88) continuously due to switch (47), the limited duration of an alternating frequency current supply of Joseph et al. is inherently a fraction of the supplied alternating frequency current.

***Joint Inventors – Common Ownership Presumed***

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 3742

***Claim Rejections - 35 USC § 103***

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

22. Claims 15-17 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch (European Patent Application Publication No. EP 1180652A1).

The claims differ from Hirsch in calling for the value range of said voltage value being divided into a plurality of intervals, each said interval has a fixed pulse-duty ratio assigned. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to divide the voltage values into a plurality of intervals or groupings with each interval/grouping having a fixed pulse-duty ratio, since it was known in the art that creating a look-up table of reference values in interval/groupings reduces the overhead in required memory to store data and decreases processing time required to

Art Unit: 3742

access large memory stored look-up tables, thereby increasing the response time and operating efficiency of a control system.

In addition, the claims differ from Hirsch in calling for the ratio from the upper to lower limit of each said interval being between 1.1 and 1.2. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to make the ratio from the upper to lower limit of each said interval being between 1.1 and 1.2, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

The claims further differ from Rutherford in calling for the recording circuit assigning below 150 VAC or 165 VAC a pulse-duty ratio of 1. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to make the recording circuit assign voltage values below 150 VAC or 165 VAC a pulse-duty ratio of 1, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

23. Claims 15-17 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joseph et al. (U.S. Publication No. 2004/0004803) in view of Hirsch (European Patent Application Publication No. EP 1180652A1).

The claims differ from Joseph et al. in calling for the value range of said voltage value being divided into a plurality of intervals, each said interval has a fixed pulse-duty ratio assigned.

However, using look-up tables in defroster voltage varying compensation applications, as described by Hirsch, is known in the art. Hirsch teaches that it is known in the art to provide a look-up table having voltage compensating pulse-width variation values with respect to detected voltages. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide the microprocessor of Joseph et al. with the look-up table for voltage compensating pulse-width variation values with respect to detected voltages of Hirsch, in order to reduce the processor's required calculations to attain the voltage pulse-width variation value and provide a quicker response time with respect to voltage variation measurement, thereby increasing the operating efficiency of the system.

Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to divide the voltage values into a plurality of intervals or groupings with each interval/grouping having a fixed pulse-duty ratio, since it was known in the art that creating a look-up table of reference values in interval/groupings reduces the overhead in required memory to store data and decreases processing time required to access large memory stored look-up tables, thereby increasing the response time and operating efficiency of a control system.

The Joseph-Hirsch refrigeration and a method of operating a defroster heater of the refrigeration device combination discloses all of the limitations, as described in claims above, except for the ratio from the upper to lower limit of each said interval being between 1.1 and 1.2. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to make the ratio from the upper to lower limit of



Art Unit: 3742

each said interval being between 1.1 and 1.2, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

In addition, the Joseph-Hirsch refrigeration and a method of operating a defroster heater of the refrigeration device combination discloses all of the limitations, as described in claims above, except for the recording circuit assigning below 150 VAC or 165 VAC a pulse-duty ratio of 1. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to make the recording circuit assign voltage values below 150 VAC or 165 VAC a pulse-duty ratio of 1, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3742

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Stephen J Ralis  
Examiner  
Art Unit 3742

SJR  
January 12, 2007



ROBIN EVANS  
SUPERVISORY PATENT EXAMINER

1/22/07